

**PROCEEDINGS OF THE  
NEW YORK ENTOMOLOGICAL SOCIETY**

**Editor's Note:** The Proceedings of the Society will appear in a severely edited format in order to conserve **Journal** space and to bring them up to date. The meetings are held in Room 129 of the American Museum of Natural History unless otherwise noted.

**Correction** Vol. LXXII No. 1, page 67 paragraph 2 of the May 16, 1961 meeting. Instead of "Owl's Head moths" it should have read: "catching three specimens of the butterfly *Caligo insularis* Stich. She reported finding the wood rose, *Opomea tuberosa* Linn. never before found in Jamaica; *Acrosynanthus jamaciensis*, a new species described by Howard and Proctor, Jour. Arnold Arboretum 1958 #39, p. 101; *Euphorbia punica*, which had not been reported since first found in 1688; and *Gynura auriantica*, a native of Java, never before recorded from Jamaica, a composite with yellow flowers and metallic purple hirsute covering on leaves and stems.

MEETING OF OCTOBER 3, 1961

President Schmitt presided: 23 members and 8 guests were present. Two of the guests were Mr. Noriyoki Toyama of the Bank of Japan and Doctor David Miller of the Biology Department C.C.N.Y.

**PROGRAM Summer Field Experiences.** Mr. Daniel Schweitzer told of his work with the carpenter ant at Syracuse University, College of Forestry. He showed their destructive work on wood, and he pointed out some of their unusual characteristics; one of which is a nest with all male or all female broods. Mr. Heineman continued his collection of Heterocera at his home in the Thousand Islands from May through October. This past summer a wasp sting caused a serious reaction and necessitated injections to counteract this reaction. Mr. Brush related his poor Lepidoptera collecting on the arid Dutch Caribbean islands of Aruba and Curacao. Miss Alice Gray showed a series of excellent drawings of insects and flowers which are being done under her supervision by the Museum staff for the new Hall of Invertebrate Biology. Kodachromes of insect studies were shown by Mrs. Mautner, Mr. Poelzl, Dr. Teale, and Mr. Foss. Dr. Asher Treat described the reactions of moths exposed to bat sounds.

RAYMOND BRUSH, SEC.

MEETING OF OCTOBER 17, 1961

Vice-President Elsie B. Klots presided in Room 319; 27 members and 18 guests were present. The guests included Dr. Arnaud, a visiting Dipterist working at the Museum, Miss Farida Wiley of the Museum Educ. Dept. and relatives and friends of members.

**PROGRAM The Year at Trail Wood** by Dr. Edwin W. Teale. The speaker presented a beautiful and interesting series of color slides concerning the natural history of his farmstead in northern Connecticut. The presentation and the slides were up to Dr. Teale's usual excellence.

PETER H. DIX, ASST. SEC.

NOVEMBER 7, 1961—ELECTION DAY, NO MEETING

MEETING OF NOVEMBER 21, 1961

President Schmitt presided; 14 members and 6 guests were present. President Schmitt reported on the Leidey Medal Award presented to Robert E. Snodgrass by the Philadelphia Academy of Sciences on December 17. Dr. Schmitt was the Society's delegate. This award, made once every three years for "Outstanding Publications in Science,"

was made to Dr. Snodgrass for the beauty of his illustrations. Miss Alice Gray, Spoke about the activities of the Junior Division of the Society and its continuing growth.

PROGRAM Reports by two entomologists from Rutgers University were presented. The first speaker of the evening, Mr. William Coniglio, spoke on **Field Observations on *Calosoma* in Southern New Jersey**. He showed slides illustrating the terrain and flora where he collected. The second talk by Mr. Wayne Crans was, **A Host Preference Study on N. J. Mosquitoes**. He described his methods of capture and determination of their blood-feeding habits. He commented on the extensiveness of this work and its value in other areas of biology and medicine.

RAYMOND BRUSH, SEC.

MEETING OF DECEMBER 5, 1961

President Schmitt presided in Room 419; 31 members and 33 guests were present. Mr. Gary Richard Lipton of Rutgers University was proposed for membership. It was voted to suspend the By-Laws and Mr. Lipton was elected unanimously. Dr. Schmitt announced receipt of a check for \$100.00, a gift of Mr. and Mrs. Nordenschild in honor of the 40th wedding anniversary of their friends, the Heinemans.

PROGRAM **Life As It Is** by Dr. Roman Vishniac. He presented a superb color movie entitled, "The Living Tide." Here were exhibited barnacles, tunicates, snails, amphipods, oyster larvae, scallops, copepods, starfish, a blue crab, horseshoe crab embryos prior to hatching, and numerous other creatures of the sea.

PETER H. DIX, ASST. SEC.

MEETING OF DECEMBER 19, 1961

Dr. Schmitt presided in Education Hall; 20 members and 22 guests were present. Dr. Richard W. Fredrickson and Miss Sonia Blank were proposed for membership. It was agreed to suspend the By-Laws and they were unanimously elected.

PROGRAM **A Field Trip to the Caribbean** by Mr. Bernard Heineman. Mr. Heineman introduced Mr. Benjamin Spanier of the Stereo Club of N. Y., who gave a brief explanation of stereo photography and the purpose of the special glasses which the audience would use to view the pictures. Mr. Heineman then spoke about the natural history and the color on the various islands he visited. His 66 stereo slides of birds, plants, trees, flowers, vistas of mountains, streams, forests and people of these beautiful islands enchanted us all. He also exhibited two cabinets containing some of the many hundreds of insects he collected on this trip.

RAYMOND BRUSH, SEC.

MEETING OF JANUARY 2, 1962

President Schimtt presided at the annual meeting; 23 members and 10 guests were present. Reports were made by Dr. Elsie Klots for the Program Comm. and by Mr. Jacob Huberman, the Treas. Dr. James Forbes of the Nominating Comm. presented the slate of officers for the coming year:

President .....	Dr. John B. Schmitt
Vice-President .....	Dr. Daniel Ludwig
Secretary .....	Mr. Peter Dix
Assistant Secretary .....	Miss Leonore Grossman
Treasurer .....	Mr. Jacob Huberman
Assistant Treasurer .....	Mrs. Patricia Vaurie
Editor of JOURNAL .....	Dr. Lucy W. Clausen
Associate Editor .....	Dr. James Forbes



Publication Committee .....	Mr. Bernard Heineman
	{ Mr. E. Irving Huntington
	{ Mr. Frank A. Soraci
Trustees .....	{ Dr. Edmund R. P. Janvrin
	{ Mr. Lucien Pohl
	{ Dr. Jerome G. Rozen, Jr.
	{ Dr. Asher Treat

(Nominations Committee: Lucy W. Clausen and James Forbes)

There were no further nominations from the floor and the secretary cast one ballot for their election.

Mr. Bernard Heineman made a motion to amend Article I of the By-Laws as follows: "4. Sustaining members shall be active members who voluntarily elect to become sustaining members by paying \$25.00 in lieu of the regular dues of \$9.00."

Notice of this proposal has already been sent out by order of the Executive Committee.

PROGRAM **The Comparative Anatomy of the Insect Thoracic Nervous System** by Dr. John B. Schmitt. The talk was illustrated with lantern slides. An abstract follows.

RAYMOND BRUSH, SEC.

**Insect Thoracic Nervous System**

The knowledge on which we base our morphological theories is gathered chiefly from comparative anatomy, embryology and paleontology. For the past decade I have studied the comparative anatomy of the insect nervous system, in the hope of arriving at a set of concepts on the fundamental or ancestral patterns of segmental nerve distribution.

So far detailed information on the precise distribution of the thoracic nerves has been published on only eleven species of insects, distributed through six different orders, and five of these species are in the Orthoptera. Despite the small number of species studied, various authors have attempted to arrive at ideas on the homologies of the various nerves and nerve groups. None of these attempts are completely satisfying, and, until completely reliable criteria of nerve homologies can be found, it is unlikely that a comprehensive plan will be feasible.

The data of such studies are largely exact knowledge on how each muscle is innervated. The capacity of insect muscle groups for evolutionary fusion, splitting or loss, as well as for migration of points of insertion has not prevented us from reaching remarkably consistent ideas on the fundamental musculature of the insect segment. The arrangement of nerve groups according to the kind of muscles each group serves offers one approach to the problem of fundamental nerve plans.

I studied the nervous system of the Carolina locust, *Dissosteira carolina*, and from these studies, offered a nerve plan which proposed that three main nerve roots are given off from each segmental ganglion. The fact that a neuropteran, *Chauliodes*, was found by Maki to present an almost identical pattern suggested a fundamental basis for such a plan, but comparison with other insects indicate that such is not the case.

Perhaps the most encouraging feature of this subject is the evidence of new interest in it by the physiologists, and the number of recent studies published.

JOHN B. SCHMITT

MEETING OF JANUARY 16, 1962

President Schmitt presided; 23 members and 11 guests were present. Mr. Stephen B. Harris of 235 Seaman Avenue, New York City was proposed for student membership.

The proposed amendment to the By-Laws for establishing a new class of membership (see Meeting of Jan. 2) was approved.

PROGRAM **Insect Notes** by Dr. Alexander B. Klots. The speaker presented a series of color slides taken on recent field trips supplemented with important biological and photographic notes. He showed a large millipede which emits a cyanide odor from stink pores on the sides of its body, examples of industrial melanism in our local moths, and collecting at night with black lights. The photographs were excellent, the comments were most interesting and informative; a usual Klots presentation.

PETER H. DIX, SEC.

#### MEETING OF FEBRUARY 6, 1962

President Schmitt presided in Room 419; 18 members and 9 guests were present. Mr. Stephen B. Harris was elected to membership.

PROGRAM **What's New in Pest Control** by Mr. Frank A. Soraci, Director of the Div. of Plant Industry, N. J. State Dept. of Agric., Trenton, N. J., and a former Editor of the Society's **Journal**; Mr. Robert C. Wiley, and Mr. John C. Harshbarger, Research Assistants in the Dept. of Ent. at Rutgers University, New Brunswick.

Mr. Soraci discussed the organization and operation of various plant pest control programs. These programs, handled by the Bureau of Entomology and Plant Quarantine until 1952, are now co-financed and operated by the Federal and the State governments. There are 12 state cooperative programs. . . . The object is to prevent spread of a pest and ultimately, if possible, to eradicate it. Various programs include those against grasshoppers and mormon crickets in the Mid-west, gypsy moths in the East, citrus black flies in N. Y. State, Khapra beetles, nematodes, and plant diseases. Twelve species are currently being attacked in the co-op projects. The cost is some \$25,000,000 per year or 15¢ per capita. Mr. Soraci briefly described the aerial spraying and dusting programs for the gypsy moth in the New York-New Jersey area in recent years, and the threat of the European chafer in Brooklyn and N. J. since 1959. The white-fringed beetle from N. Carolina posed a threat in N. J., beginning in 1954. Slides of pests and their damage were shown.

Mr. Wiley discussed **Pest Control by Chemical Sterilization**. He noted that because insecticides are producing the build-up of insect resistance and upsetting natural balances the underlying philosophy in control work is shifting the emphasis from chemical to biological methods. An abstract follows.

Mr. Harshbarger discussed **The Roles of Hormones and Diseases in Pests**. Protozoa, bacteria, fungi, viruses, and nematodes include pathogens which cause natural diseases in insects. The hormones are the growth and development hormone found by Wigglesworth in 1934 and the juvenile hormone discovered by Williams some years later. However, only bacteria and viruses have had some definite successes; the milky disease in the Japanese beetle and nuclear poly-hedrosis in the gypsy moth. Biological or handling factors have prevented much use of other types of organisms. The juvenile hormone is limited in usefulness because it does not penetrate readily on application to the insect, and must be applied at a critical time in the insect's development. Mention was made of the role which stress may play in increasing the susceptibility of insects to both obligate and facultative pathogens.

PETER H. DIX, SEC.

#### **Pest Control by Chemical Sterilization**

The method of screwworm fly control by atomic radiation involves the release among



the wild population of male flies that have been made sexually sterile by exposure to gamma rays. However, the method is not economically feasible for most insects. Most species of insects occur in such great numbers that it would be too costly to release a dominant population of sterile males. Methods of rearing many insect species have not been developed. Many insects have a limited flight range.

If a chemical or other satisfactory method of causing high sexual sterility could be developed which could be applied to the natural population of certain insects, it would not be necessary to rear and release insects, as was done for screwworm eradication. Thus, entomologists have turned to chemical agents which are able to exert a toxic action on cell nuclei without injuring the cytoplasm. They appear to be active only on dividing cells and have sometimes been called mitotic poisons and act, as antimetabolites against folic acid and alkylating agents. Chemicals which have been used as mitotic poisons include colchicine, aminopterin, benzimidazole, nitrogen mustard, diamino biuret, ethionine, methoxytoluquinone, ethyleneimines. Only derivatives of this last compound disrupt normal male gamete formation, and the chemosterilants Aphoxide and Apholate contain multiple ethyleneimine groups. These have produced sterilization of houseflies and mosquitoes through feeding and contact, and mosquito adults are sterilized when the larval medium has been treated.

ROBERT C. WILEY

#### MEETING OF FEBRUARY 20, 1962

Dr. Schmitt presided in Room 419; 22 members and 3 guests were present. It was announced that Dr. C. P. Alexander made a bequest to the Society in his will. Mr. David Miller of the Biology Department, C.C.N.Y. and Mr. Jack Peplinski of 158-12 Grand Central Parkway, Jamaica 32, N. Y. were proposed for membership.

**PROGRAM I The Biology and Systematics of Hydrophilidae of the Pacific Northwest** by Mr. David Miller. The biology and unique anatomical adaptations of these insects to their littoral, weedy habitat in ponds, streams and lakes were described. Most of them (Hydrophilinae and Berosinae excepted) are not good swimmers. Generally, the larvae are carnivorous and cannibalistic; the adults herbivorous. The eggs are found mostly in complex cases with a "mast" or "snorkle" for respiration. The larvae also breathe outside the water with a pair of functional spiracles in a stigmatic atrium at the tip of the abdomen. They feed by external digestion, and consequently commonly found at the edge or surface of the water with both ends protruding. Pupation occurs in a chamber in damp soil or on a tripod of spines on damp substrate. The adults respire by means of hydrofuge hairs connecting with air reservoirs under the elytra and in a ventral bubble. To replenish this supply a beetle surfaces, extends its specially modified antennae into the air for gas exchange, retracts them and returns to lower levels. The antennae have presumably lost their sensory function which may account for the elongation and development of the maxillary palpi as substitutes.

**II The Use of Timed Traps in Studying Mosquito Flight Periodicity** by Mr. Thomas Bast, Research Associate at Rutgers University in New Brunswick. He demonstrated his apparatus for collecting adult mosquitos separately at 2 hour intervals in the standard N. J. traps and explained that this was a means by which flight activity could be correlated with biting activity for determination of optimum time for spray or dust application. A hygrothermograph recorded temperature and humidity. By a study of graphs it was shown that an increase in population flight activity took place above 80% relative humidity and between 64° and 80° F. The mosquito light trap was 6 ft. above the ground.

PETER H. DIX, SEC.

## MEETING OF MARCH 6, 1962

Vice-president, Dr. Daniel Ludwig, presided in Room 419; 11 members and 7 guests were present. Because of the severe storm raging in N. J. the President and members from that state were unable to attend. In the absence of the Secretary the undersigned was asked to act as Secretary *pro tem*. Mr. David Miller and Mr. Peplinski were elected to membership. Major Milton B. Flemings, Chief Entomologist of the 1st Army Area, U. S. Army Medical Laboratory, 90 Church Street, New York, N. Y., was nominated for membership and Mr. Joseph Grossfield of Brooklyn, N. Y., for student membership. The death of our Honorary Member, Dr. James H. McDunnough, last Friday in Halifax, Nova Scotia was announced.

**PROGRAM Mosquito Surveillance Program of the First U. S. Army Area** by Major Milton B. Flemings. The speaker outlined his duties and then discussed the characteristics and habits of some of the 27 species of mosquitoes found in the area. His talk was illustrated.

ELSIE B. KLOTS, SEC., *pro tem*

**Mosquito Program in the First U. S. Army Area**

Seventeen military installations in New York, New Jersey, and the New England States participate in this program. The post surgeon is responsible for mosquito surveillance while the post engineer is responsible for mosquito control. This program determines the qualitative and quantitative mosquito population, the occurrence and extent of mosquito breeding, the effectiveness of control measures, and develops the control program.

The surveillance activities consist of light trap collections (3-7 times weekly), resting station collections (twice weekly), larval collections (once weekly), and surveys at various times. Specimens are prepared for determination or for shipment to appropriate laboratories and/or specialists. Records are kept and reports are prepared.

The following mosquitoes, frequently collected from this area, are listed in order of their medical importance and/or nuisance value: *Culiseta melanura* (Coq.)—enzootic Eastern virus encephalitis vector; *Culex pipiens pipiens* Linn.—St. Louis encephalitis vector and of extreme nuisance value; *Aedes sollicitans* (Walker)—numerous and a persistent biter; *Aedes vexans* (Meig.)—numerous and a persistent biter; *Culex restuans* Theo.—suspected EVE vector; *Culex salanarius* Coq. numerous and a persistent biter; *Mansonia perturbans* (Walker)—potential EVE vector and a persistent biter; *Anopheles crucians* Wied.—potential malaria vector; *Aedes canadensis* (Theo.)—persistent biter; *Aedes cantator* (Coq.)—persistent biter; *Psorophora confinnis* (Lynch)—persistent biter; *Anopheles punctipennis* (Say)—occasionally attacks man.

Graphs, representing the general mosquito population index for this area, showed that the population reached its peak approximately one month earlier in 1956, 1957, 1958, and 1960 when compared with 1959, the year of the EVE outbreak, and 1961.

MILTON B. FLEMINGS

## MEETING OF MARCH 20, 1962

President Schmitt presided in Room 419; 17 members and 3 guests were present. Dr. Schmitt exhibited a mounted swallowtail butterfly having its right forewing of the dark form and the others of the lighter color pattern; a biological freak but not a gynandromorph. It was reared and sold as a pupa by a graduate student at Rutgers University to a collector, who returned it upon request after reporting it and sending a color photograph. This *Papilio* is apparently a female of the combined northern and



southern forms. Major Milton B. Flemings, Chief of the Entomology Division, First Army Medical Laboratory, N. Y., and Mr. Joseph Grossfield of Brooklyn, N. Y., were elected to membership.

PROGRAM **Our Garden is a Harbor**, by Mr. and Mrs. Philip Bergh of Little Neck, Queens. Their presentation included color transparencies of insects and other animals together with comments and notes. Stages in the life histories of a praying mantis and several butterflies were shown. On occasion their living room has been turned into a vivarium to rear insects. Their garden is on the north shore of L. I. and is a beautiful harbor for insects as well as for boats.

PETER H. DIX SEC.

#### MEETING OF APRIL 3, 1962

President Schmitt presided; 22 members and 14 guests were present. Dr. Rozen introduced Dr. T. C. Maa of Taiwan, who is at present working on bat flies at the Museum.

PROGRAM **Highlights of Collecting on the Alaska Highway and in Mt. McKinley National Park** by Dr. Richard W. Fredrickson of the Queens College Biol. Dept. The speaker was one of four participants in a University of Kansas expedition. His main interest was in mites. He took us on the trip via many beautiful color scenes of magnificent mountains, gorges, lakes, and the highway.

In northern British Columbia the group enjoyed the almost tropical flora and fauna around Liard Hot Springs. Further points were White Horse and Fairbanks, Alaska on the Alaska Railroad. The Arctic Museum and the Biology Department at the University of Alaska were visited. A crane fly found in the Anchorage, Alaska, railroad station resulted in considerable publicity for the group. From Seward the return trip began, back to Anchorage and along the Alaska Highway again to the Hot Springs and Dawson Creek, Glacier, Yellowstone and Grand Teton National Parks, Jackson Hole, Wyo., Nebraska, and to Kansas.

PETER H. DIX, SEC.

#### MEETING OF APRIL 17, 1962

In the absence of the President and the Vice-President, Dr. James Forbes presided; 19 members and 10 guests were present. Miss Alice Gray announced that the President of the Junior Society, Alfred Blanche, won a major prize in a recent science contest in his high school. The Secretary was advised to send letters of congratulations from the Society to Mr. Blanche and to his teacher. The death of Professor Goldforb, former Chairman of the Biol. Dept. at C.C.N.Y. and an invertebrate zoologist, was noted.

PROGRAM **Vitamin Synthesis by Symbionts in the Fat Body of the Cockroach *Periplaneta americana* (Linn.)** by Miss Margaret Gallagher. The speaker is a graduate student working with Dr. Ludwig at the Biol. Lab., Fordham Univ. A lively discussion followed her paper. An abstract follows.

PETER H. DIX, SEC.

#### **Vitamin Synthesis by the Symbionts in the Fat Body of the Cockroach *Periplaneta americana* (Linnaeus)**

The term symbiosis is defined as a relationship between two organisms that is constant, intimate, mutually contributory, and vitally necessary for both organisms. It implies the metabolism of each supplies essential elements for the other. The present work

was undertaken to show what metabolic requirements were supplied by the symbionts in the fat body of the cockroach *P. americana*.

Fat bodies, aseptically removed from normal and aposymbiotic roaches, were homogenated and then quantitatively tested for ascorbic, nicotinic, pantothenic and folic acids, riboflavin, thiamine, pyridoxine, biotin, inositol and cyanocobalamin. Results of two analytical procedures showed the aposymbiotic fat bodies to be greatly deficient in ascorbic, folic and pantothenic acids.

Smaller groups of insects were then separated from both the normal group and from the aposymbiotic group. One group of each type was placed on a diet completely lacking in the vitamin B complex. Within 33 days all the aposymbiotic insects had died. The same number of each type was placed on a diet lacking in ascorbic acid and neither group showed any adverse affect. Two other groups, one from each type, were placed on a diet lacking in vitamin B complex with added folic and pantothenic acids and the aposymbiotic forms appeared normal in all aspects except being of lighter cuticular color. The last aposymbiotic group was placed on a normal diet not supplemented with yeast and eventually all died. The symbionts were removed from the fat bodies and cultured in lactose broth. These cultures were shown to be able to synthesize pantothenic and folic acids.

From the results of the observations and the quantitative tests the author concluded the symbionts were responsible for the synthesis of folic, ascorbic and pantothenic acids in the cockroach.

MARGARET R. GALLAGHER

#### MEETING OF MAY 1, 1962

President Schmitt presided; 24 members and 9 guests attended.

**PROGRAM Neurosecretion and Behavior** by Dr. Edward S. Hodgson of Columbia University. The speaker discussed the role of neurosecretory hormones from the corpora allatum and cardiacum and their effects upon behavior and mating activity of the tropical roach, *Blaberus craniifer*. His talk was illustrated with both slides and movies. An abstract follows.

PETER H. DIX, SEC.

#### Neurosecretion and Behavior

The roles of neurosecretory hormones in behavior been analyzed on the neurophysiological level, using the cockroach as the experimental animal. Corpora cardiaca release neurosecretory hormones into the hemolymph and into axons connected to the subesophageal ganglion. Regulation of locomotor activity can be produced either by direct effects of corpus cardiacum extracts upon ganglia or by effects mediated via an inhibitory center in the subesopagheal ganglion; the latter type of mechanism is responsible for effects of the extracts upon the "release" of copulatory reflexes. The pharmacology of corpus cardiacum extracts and the selective advantages which might be associated with their behavioral effects are discussed and compared with roles of neurosecretory hormones in other arthropods, with emphasis upon unsolved problems.

EDWARD S. HODGSON

#### MEETING OF MAY 15, 1962

President Schmitt presided; 18 members and 11 guests were in attendance. The Treasurer announced that Irene and Robert Alexander had donated \$50 to the Society in honor of Mr. Heineman. Miss Gray mentioned that the Museum was seeking informa-



tion on local 17-year cicada emergences in order to secure photographs of such activity.

PROGRAM I "Changes in the Activity of Several Respiratory Enzymes in Various Organs During the Metamorphosis of the Mealworm, *Tenebrio molitor* Linnaeus" by Mr. C. Robert Jones who is currently completing his doctoral work at Fordham University under Doctor Ludwig. An abstract of his talk follows.

II Effects of Parental Age on the Life Cycle of the House Fly, *Musca domestica* Linnaeus by Dr. Robert F. Callahan of the Biol. Dept. of Fairleigh-Dickinson University, N. J. and a former student of Dr. Ludwig. An abstract of his talk follows.

PETER H. DIX, SEC.

### Activity Changes of Respiratory Enzymes During the Metamorphosis of *Tenebrio molitor* Linnaeus.

Characteristic U-shaped curves for oxygen consumption during metamorphosis have been reported in numerous holometabolous insects. Some workers have correlated these processes with shifts in nitrogen fractions; the onset of histolysis was accompanied by a decrease of insoluble and an increase of soluble nitrogen. The U-shaped respiratory curve has been correlated with changes in enzyme activity.

The cytochrome oxidase activity of the intact insect and of various organs during metamorphosis was determined spectrophotometrically by the method of Cooperstein and Lazarow (1951). The cytochrome oxidase activity of the intact insect did not show a typical U-shaped curve. The curve was one of increasing activity during metamorphosis. U-Shaped curves were found in the heart, nerve cord, gut, and fat body. The testis and ovary showed increasing values. The activity of the body wall was irregular during this same period.

The U-shaped curves exhibited by the heart, nerve cord, gut, and fat body may be associated with histolysis of these organs. The increasing values for the ovary and testis are associated with their rapid growth and maturation during the pupal stage. The irregularity of the body wall may be due to the destruction and reconstitution of the underlying muscle.

The indication that the heart and nerve cord undergo a great deal of histolysis and histogenesis during metamorphosis is contrary to the commonly accepted view that these organs survive this period with very little change. The present experiments agree with the conclusion of Tiegs (1922), that although these structures appear externally to remain unchanged, profound changes occur within.

These observations also indicate that the metamorphosis of the mealworm is marked by a great amount of histolysis and histogenesis. It was seen that some organs undergo destruction at the same time that others undergo maturation, hence enzyme changes in the intact insect may be less pronounced than when individual organs are studied.

C. ROBERT JONES

### Effects of Parental Age on *Musca domestica* Linnaeus.

A parental age study of 2 strains of house flies, *Musca domestica*, was undertaken. It the CSMA strain 18 consecutive generations, from the first eggs laid in each generation, and 2 consecutive generations from the  $F_2$ , the  $F_4$ , and 3 from the  $F_9$  obtained from the last eggs laid were studied. In the Wilson strain, 12 consecutive generations from the first eggs laid, 9 from middle-aged parents, and 6 from old (18 days) parents were studied at 25°C. under constant conditions of lighting.

There was no parental age effect on the duration of the preimaginal stages, the larvae and the pupae each requiring 6 days. A reduction in the survival time occurred for adults of both strains when the first eggs laid in successive generations were selected. The use of the last viable eggs in the CSMA strain resulted in a decreased longevity and a reduction in reproductive capacity. No more than 3 consecutive generations could be reared.

Adult flies at the age of 0 and 6 days from both young and old parents were kept at different humidities without food. Those from young survived longer than those from old parents.

ROBERT F. CALLAHAN

**Necrology.** It is with deep regret that we note the passing of Alexander Petrunkevitch, an Honorary Member of our Society, on March 9, 1964 at the age of 88. Professor Petrunkevitch was regarded as the world's foremost authority on spiders and other arachnids.